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Crustal and upper mantle seismic structure of Russia from teleseismic receiver functions

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We map the lithospheric structure in Russia by using the available broadband seismic data for calculation of Ps- and Sp-wave receiver functions (RF). We analyze data from 35 stations.
The main objective is to image the Moho and upper mantle discontinuities, including the lithosphere-asthenosphere boundary (LAB) beneath the study area. We construct the RF using the LQT method (Vinnik, 1977; Kind et al. 1995) in the version by Yuan et al. (1997).
The RF model images the crustal thickness between 35 and 55 km at the stations analyzed. Additionally, intracrustal discontinuities are identified by high-frequency S-RFs. Teleseismic converted Ps waves have higher frequency content (0.5–2 Hz) than Sp, which have an upper frequency of 0.1–0.2 Hz, and therefore Ps have about an order of magnitude better resolving power than Sp. The converted Sp-wave rarely resolve intracrustal structure, but can be used for determining Moho depth, and for detecting relatively broad vertical gradients in velocity, such as expected for LAB. The combination of both types of RFs allows for independent determination of discontinuities in different frequency bands using converted waves with very different raypaths. We further determine velocity-depth models by simultaneous inversion for the P- and S-wave structure where the S-wave velocities generally are better resolved than the P-wave velocities.
The results of RF analysis of the crustal and mantle structure is used for building a model for tectonic and geodynamic evolution for the study area.